



FILE

11 February 2005

Mr. Mark Verhey  
Certified Engineering Geologist  
Humboldt County Division of Environmental Health  
100 H Street, Suite 100  
Eureka, CA 95501

Re: **Groundwater Monitoring Report - Fourth Quarter 2004**  
Seymour Residence  
1111 Riverside Drive  
Rio Dell, CA  
LOP # 12032  
Project # AE001E

Dear Mr. Verhey,

On behalf of Jean and Everett Seymour, Clearwater Group (Clearwater) has prepared this *Fourth Quarter 2004 Groundwater Monitoring Report*. It presents background information, monitoring activities and monitoring results, conclusions, recommendations, and the planned activities for the referenced property (see Figure 1 for a vicinity map).

### **Background**

The subject site had one 550-gallon capacity gasoline underground storage tank (UST). The tank location is shown in Figure 2. The tank was operated until 1987 when permitting began for in-place closure of the UST. In February 1988, the tank was abandoned in-place in accordance with the requirements of the Humboldt County Division of Environmental Health (HCDEH). According to HCDEH files, one soil sample (Rio Dell) was collected from an unspecified location by Beacom Construction of Fortuna, CA under HCDEH supervision in the vicinity of the UST at that time. Soil analytical results indicated that a release of petroleum hydrocarbons had occurred.

In February 1989, three additional soil samples (B-1, B-2, B-3, Figure 2) were collected by Beacon Construction from the south end of the tank. The depth and specific locations of each of



the three borings is unknown. However, patches in a concrete drive suggest the locations of these three former boring locations. Laboratory analytical results indicate that two of the three soil samples (B-2 and B-3) contained detectable concentrations of gasoline-range hydrocarbons.

In June 1999, the HCDEH collected groundwater samples from two borings (B-1 and B-2, Figure 2) from the vicinity of the closed UST. Each boring was advanced using a hand auger to a depth of approximately 7 to 8 feet below ground surface (bgs). The HCDEH also collected one groundwater sample from an on-site irrigation well (no longer used for drinking water). Of the three samples collected by the HCDEH, only the groundwater sample collected from boring B-1 contained detectable concentrations of petroleum hydrocarbons. In a letter dated May 30, 2000, the HCDEH requested that a hydrogeologic investigation be performed. Clearwater subsequently prepared and submitted a *Workplan for Subsurface Investigation* dated July 19, 2000 to the HCDEH.

On December 8, 2000, Clearwater advanced five soil borings near the abandoned UST to define the extent of petroleum hydrocarbon contamination at the subject property. The borings were advanced by hand Geoprobe™ equipment to depths ranging from 8 to 10 feet bgs. The soil borings were located north, northwest, west, and south of the former UST (Figure 2). Data collected during this investigation are presented in Clearwater's *Subsurface Investigation Report* dated March 23, 2001.

In a letter dated May 15, 2001, the HCDEH requested a two-phase Corrective Action Plan be prepared to implement Clearwater recommendations contained in an *Initial Subsurface Investigation Report*, dated January 25, 2001, which included installation of groundwater monitoring wells and possible excavation of the abandoned UST. Clearwater subsequently prepared and submitted a *Corrective Action Phase 1 / Subsurface Investigation and Remediation Workplan*, dated June 14, 2001 per HCDEH's request.

On March 7, 2002, Clearwater supervised the installation of four monitoring wells (MW-1, MW-2, MW-3 and MW-4, Figure 2) and initiated a quarterly groundwater-monitoring program. Results of monitoring well installation and the first quarterly groundwater monitoring are presented in Clearwater's *Monitoring Well Installation and First Quarter 2002 Groundwater*



*Monitoring Report* dated April 3, 2002. Well construction data of these wells is presented in Table 1.

### **Groundwater Monitoring Activities**

The Fourth Quarter 2004 groundwater monitoring was conducted on 4 January 2005. Monitoring wells MW-1 through MW-4 were gauged, purged, and subsequently sampled. Clearwater used an electronic water level indicator, accurate to within  $\pm 0.01$  foot, to gauge depth to water. The wells were checked for the presence of separate-phase hydrocarbons (SPH) prior to purging. No measurable thickness of SPH was observed in any of the wells.

In preparation for sampling, the wells were purged of groundwater until water quality parameters (temperature, pH, and conductivity) stabilized. Purging devices were cleaned between use by an Alconox® wash followed by double rinse in clean tap water to prevent cross-contamination. Rinseate and purge water was stored on-site in a labeled 55-gallon drum pending future removal and disposal.

Following recovery of water levels to at least 80% of their static levels, Clearwater collected groundwater samples from the wells using disposable polyethylene bailers and transferred to laboratory supplied containers. Sample containers were labeled, documented on a chain-of-custody form, and placed on ice in a cooler for transport to the project laboratory. Groundwater samples collected from MW-1 were analyzed for concentrations of total petroleum hydrocarbons as gasoline (TPH-g), benzene, toluene, ethylbenzene and xylenes (BTEX), methyl tertiary butyl ether (MTBE), di isopropyl ether (DIPE), tertiary amyl methyl ether (TAME), ethyl tertiary butyl ether (ETBE) and tertiary butyl alcohol (TBA) using U.S. Environmental Protection Agency (EPA) Method 8260B. Groundwater samples collected from MW-2 through MW-4 were also analyzed for concentrations of TPH-g and BTEX by EPA Method 8260B. Laboratory work was conducted by Kiff Analytical, a Department of Health Services (DHS)-certified laboratory, located in Davis, California. Below summarizes monitoring activities during this quarter:

|                 |  |
|-----------------|--|
| Wells gauged:   | MW-1, MW-2, MW-3 and MW-4                            |
| Wells sampled:  | MW-1, MW-2, MW-3, and MW-4                           |
| Field Analysis: | DO, ORP, Total and Ferrous Irons (MW-1 through MW-4) |



Laboratory analyses: TPH-g, BTEX, MTBE, DIPE, TAME, ETBE, TBA (for MW-1 by EPA Method 8260B); TPH-g and BTEX (for MW-2, MW-3, and MW-4 by EPA Method 8260B)

Field activities described above were conducted in accordance with Clearwater's Groundwater Monitoring and Sampling Field Procedures (attached). Groundwater gauging and well purging information are presented on Gauging/Purging Calculations and Data sheets (attached).

### Groundwater Monitoring Results

Results of the Fourth Quarter 2004 monitoring are summarized below:

|                                    |  |
|------------------------------------|--|
| Depth to water:                    | Ranged from 1.18 (MW-2) to 2.73 (MW-4) feet below top of well casing (also shown in Table 2) |
| Flow direction/gradient:           | Northwest direction with a horizontal hydraulic gradient of 0.019 ft/ft (Figure 3)           |
| Floating product:                  | None   |
| Dissolved Oxygen:                  | 30.6mg/L (MW-1 with iSOC in operation); 4.9 mg/L (MW-3)                                      |
| ORP:                               | 55mV (MW-3); 39mV (MW-2)   |
| Total iron:                        | 6.6 mg/L (MW-3); 0.4 mg/L (MW-2)   |
| Ferrous iron ( $\text{Fe}^{2+}$ ): | 0.0 mg/L (MW-1, MW-2, MW-3, MW-4)  |
| TPH-g concentration:               | <50 micrograms per liter ( $\mu\text{g/L}$ ) (MW-1, MW-2, MW-3, MW-4)                        |
| Benzene concentration:             | <0.50 $\mu\text{g/L}$ (MW-1, MW-2, MW-3, MW-4)   |
| MTBE Concentration:                | <0.50 $\mu\text{g/L}$ (MW-1)   |

Based on the historical data, area near former UST or monitoring well MW-1 has been recognized as the "hot spot" on site. Sampled TPH-g concentrations from MW-1 during the first through third quarterly monitoring events in 2004 were in the range of 2,900  $\mu\text{g/L}$  to 18,000  $\mu\text{g/L}$ . Benzene concentration ranged from 240  $\mu\text{g/L}$  to 880  $\mu\text{g/L}$  within the same period. Historically maximum MTBE concentration was 0.85  $\mu\text{g/L}$ , which was sampled from the third quarter 2004. However, no hydrocarbons and MTBE were found above detection limits in the fourth quarter 2004. Although on-site groundwater elevation observed in the fourth quarter 2004 was relatively high, it was not the historical maximum. The groundwater elevation in MW-1 measured on 4 January 2004 was 114.68 ft above msl. Based on the historical data, TPH-g and

benzene concentrations sampled in MW-1 ranged from 300 to 380  $\mu\text{g/L}$  and 21 to 35  $\mu\text{g/L}$ , respectively, when the water elevation was between 114.27 ft and 114.89 ft above msl. The cumulative groundwater elevations and analytical data for the current and previous quarters are listed in Table 2. The geochemical data in groundwater related to iSOC performance is listed in Tables 3 and 4.

### **Operation and Maintenance of iSOC System**

Both a microbiological study and baseline biological monitoring field tests (including dissolved oxygen, redox potential, total iron, ferrous iron) were performed on water samples collected on 4 August 2004 from wells MW-1 and MW-2. The results, conclusions, and recommendations were presented in a report entitled *Microbiological Study and Bench Test – Background Levels* dated on 19 August 2004. The study results indicated that hydrocarbon degraders were present in MW-1 and MW-2 and conditions for enhanced bioremediation existed. However, groundwater within the “hot spot” and MW-1 became anaerobic due to depletion of oxygen that hampered the continuing degradation of hydrocarbons. The study recommended installing an oxygen delivery system – iSOC. As a result, it was installed in monitoring well MW-1 on 6 October 2004. Dissolved oxygen in MW-1 increased from approximately 0.4 mg/L to 3.6 mg/L prior to iSOC installation to concentrations on the order of 39 mg/L within the first four weeks of iSOC system operation. Performance data for ISOC operation is presented in Tables 3 and 4.

### **Conclusions**

- Groundwater samples obtained from monitoring wells MW-2 through MW-4 once again had analyzed concentrations less than detection limits for all the hydrocarbon compounds. It is consistent with historical data.
- Delivery of oxygen using iSOC has greatly increased the DO concentration in MW-1. DO was raised from 0.4 - 3.6 mg/L prior to iSOC installation to 27.7 - 39.7 mg/L during the period of 25 October 2004 and 4 January 2004 with an operational iSOC. Field measured DO, ORP and ferrous to total iron ratio suggest that the on-site groundwater conditions near MW-1 have changed from anaerobic to aerobic.

- Concentrations of hydrocarbons and MTBE sampled from the “hot spot” monitoring well MW-1 were less than their detection limits during the fourth quarter 2004 monitoring event. These levels were much lower than the levels found in March 2002 and 2003 when the observed groundwater elevations were as high as, or higher than, the elevation monitored in January 2005.
- Bio-enhancement with pure oxygen and iSOC delivery system has converted the anaerobic conditions in on-site “hot spot” with low hydrocarbons biodegradation into an aerobic environment containing super-saturated oxygen. Concentrations and groundwater data indicate that on-site hydrocarbons have greatly reduced.
- Observed change of hydrocarbon concentrations at the “hot spot” as well as the geochemical data suggests that the installed iSOC system has demonstrated its anticipated performance.

#### **Recommendations**

- To confirm the expected groundwater remediation prior to site closure, quarterly monitoring should continue; and the iSOC system maintain current operation for, at least, three additional quarters of low levels or non-detect.
- At that point, Clearwater recommends 4 quarters of post-iSOC treatment groundwater monitoring be performed to verify that no rebound occurs and the site is remediated.
- To verify subsurface conditions, indirect geochemical indicators (Attachment II) should be evaluated every 6 to 9 months.


#### **Planned Activities**


Clear will continue the operation and maintenance of the iSOC system during the forthcoming quarterly monitoring in 2005. The planned frequency for monitoring iSOC operation has been complete. Collection of DO, ORP, total and ferrous iron, pH, temperature, and specific conductivity measurements will continue during the quarterly monitoring events in 2005.

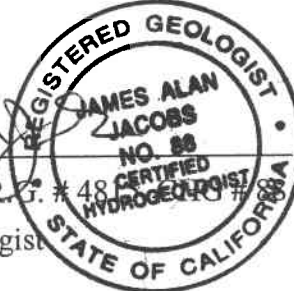
### **Certification**

This report was prepared under the supervision of a professional Registered Geologist in the state of California at Clearwater Group. All statements, conclusions and recommendations are based solely upon published results from previous consultants, field observations by Clearwater Group and laboratory analysis performed by a California DHS-certified laboratory related to the work performed by Clearwater Group. Clearwater Group is not responsible for laboratory errors. The information and interpretation contained in this document should not be relied upon by a third party. The service provided by Clearwater Group has been conducted in a manner consistent with the level of care and skill ordinarily exercised by members of our profession currently practicing under similar conditions in the area of the site. No other warranty, expressed or implied, is made.

Sincerely,  
**Clearwater Group**

  
\_\_\_\_\_  
Jim Ho, Ph.D., P.E., CGWP  
Principal Engineer

  
\_\_\_\_\_  
James A. Jacobs R.G. # 48  
Chief Hydrogeologist





## **Attachments I**

Figure 1: Site Vicinity

Figure 2: Site Plan

Figure 3: Groundwater Elevations and Gradient - 10/5/04

Figure 4: Dissolved-Phase Hydrocarbon Distribution - 10/5/04

Table 1: Well Construction Data

Table 2: Groundwater Elevations and Analytical Data

Table 3: iSOC Field Sampling Parameters

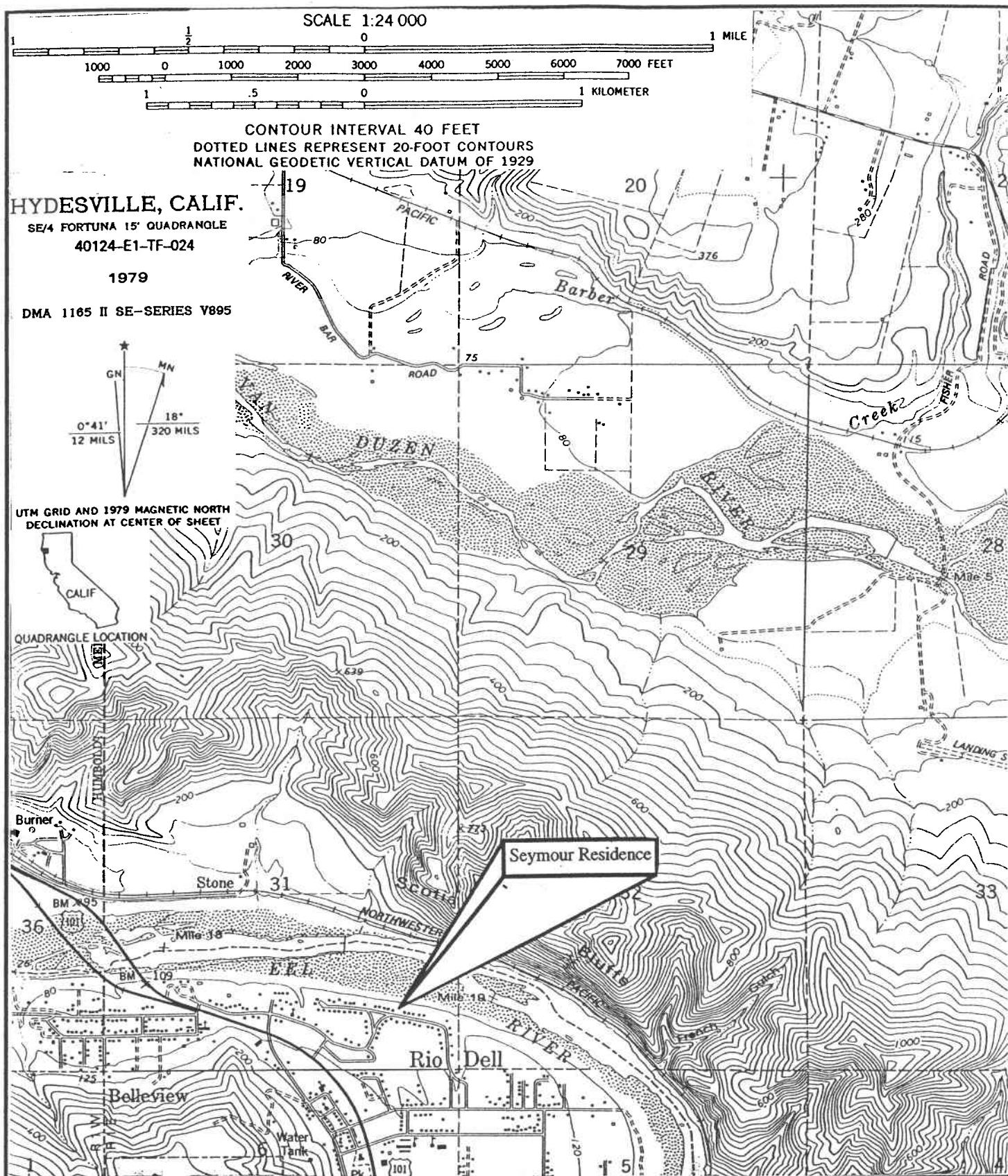
Table 4: Indirect Geochemical Indicators

Clearwater Groundwater Monitoring and Sampling Protocols

Clearwater Well Gauging Data/Purge Calculations and Well Purging Data

Laboratory Report and Chain-of-Custody Form





**Site Vicinity**  
Seymour Residence  
1111 Riverside Drive  
Rio Dell, California

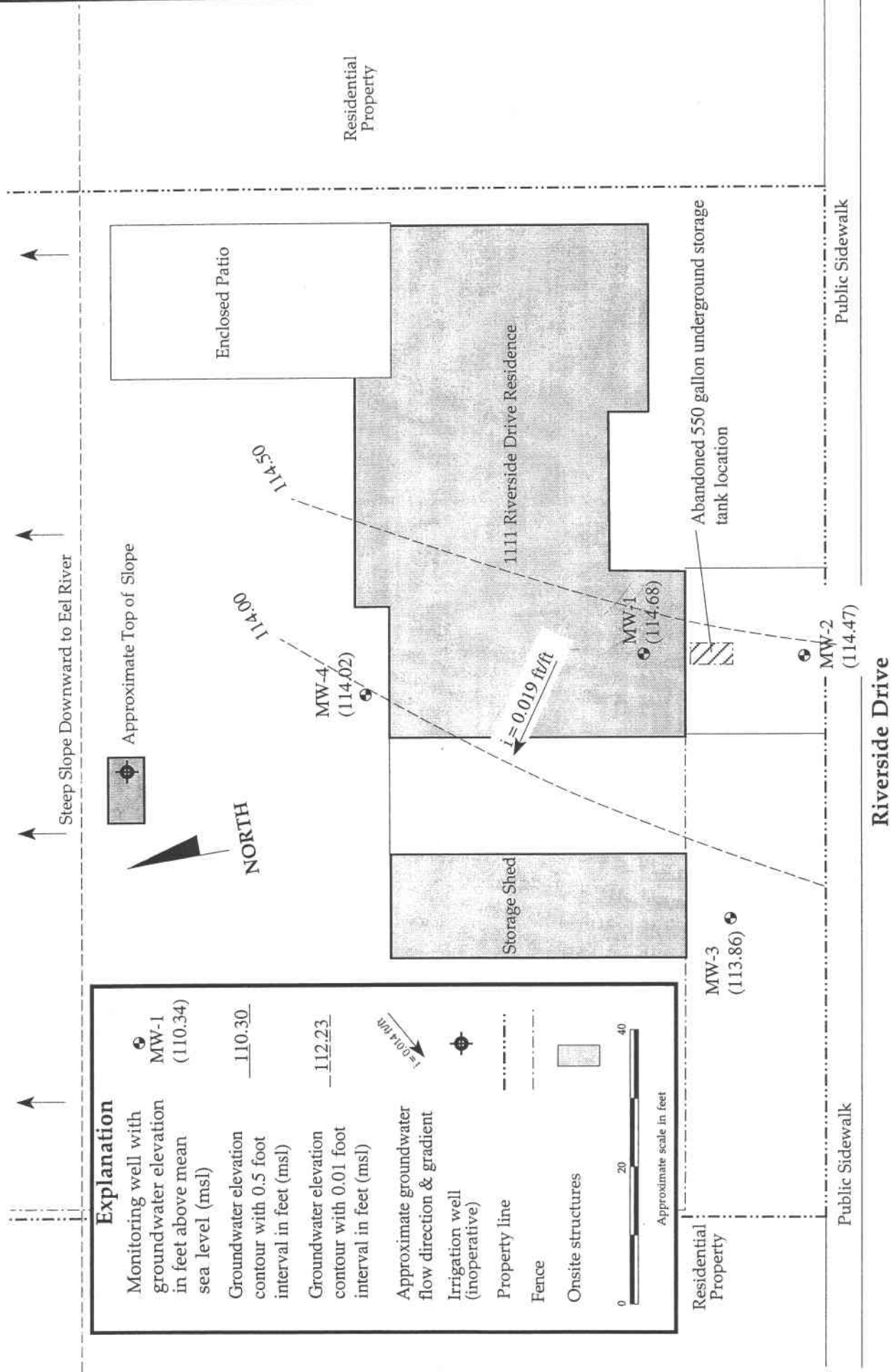
## CLEARWATER GROUP

Project No.  
**AE001E**

Date  
**2/05**

Figure  
**1**





### Explanation

- MW-1 (110.34)
- Groundwater elevation in feet above mean sea level (msl)
- 110.30
- Groundwater elevation contour with 0.5 foot interval in feet (msl)
- 112.23
- Groundwater elevation contour with 0.01 foot interval in feet (msl)
- Approximate groundwater flow direction & gradient
- Irrigation well (inoperative)
- Property line
- Fence
- Onsite structures
- 0 20 40
- Approximate scale in feet

### Groundwater Elevations and Gradient - 1/4/05

Seymour Residence  
1111 Riverside Drive  
Rio Dell, California

### CLEARWATER GROUP

|                       |                     |             |
|-----------------------|---------------------|-------------|
| Project No.<br>AE001E | Report Date<br>2/05 | Figure<br>3 |
|-----------------------|---------------------|-------------|

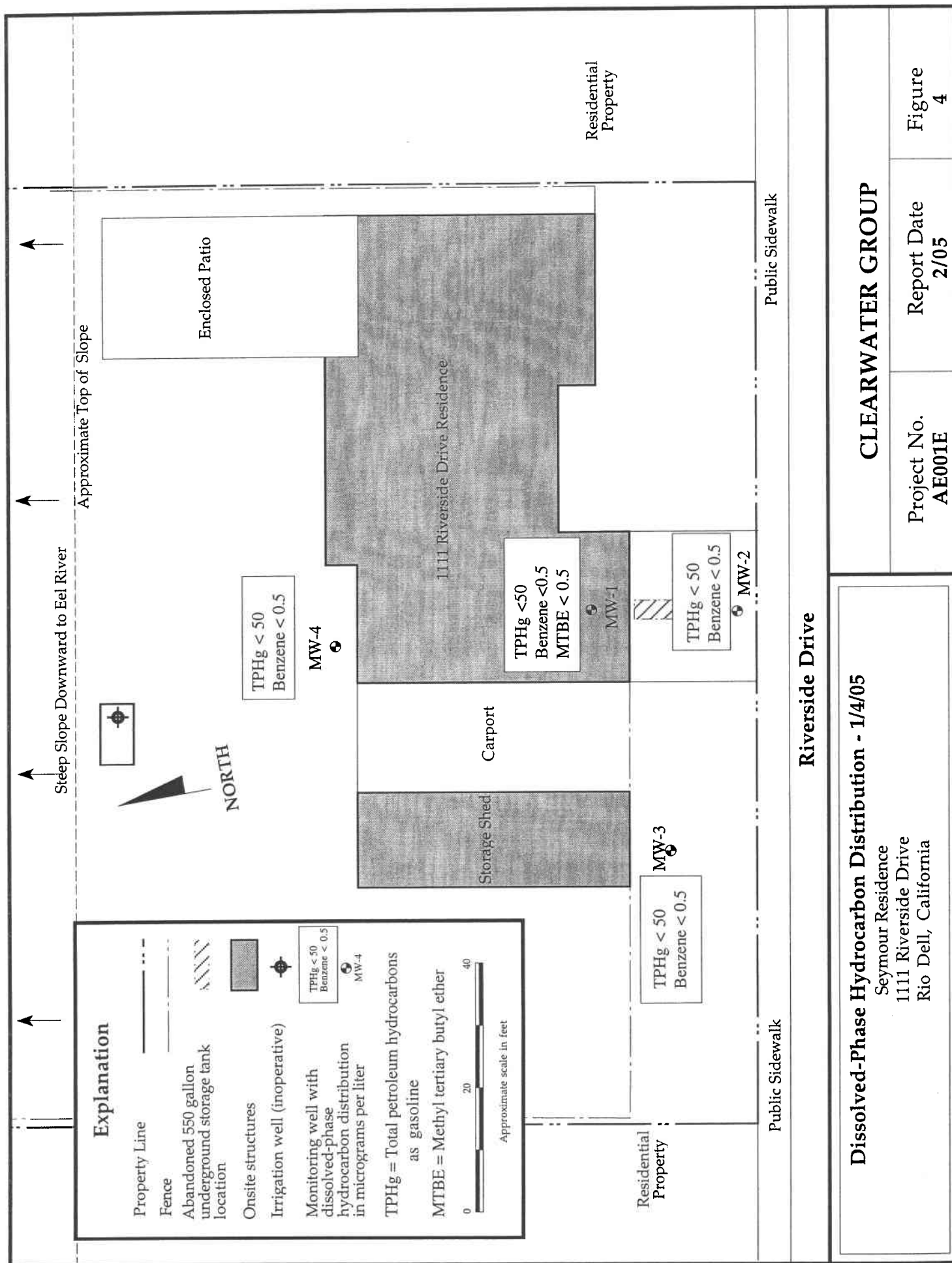


Table 1  
WELL CONSTRUCTION DATA  
Seymour Residence  
1111 Riverside Drive  
Rio Dell, California  
Project # AE001C

| Well<br>Identification | Date<br>Installed | Installed<br>by | Casing<br>Diameter<br>(inches) | Total<br>Depth<br>(feet) | Blank<br>Interval<br>(feet) | Screened<br>Interval<br>(feet) | Slot<br>Size<br>(inches) | Filter<br>Pack<br>(feet) | Bentonite<br>Seal<br>(feet) | Cement<br>(feet) |
|------------------------|-------------------|-----------------|--------------------------------|--------------------------|-----------------------------|--------------------------------|--------------------------|--------------------------|-----------------------------|------------------|
| MW-1                   | 3/7/2002          | Clearwater      | 2                              | 12.5                     | 0-3                         | 3-12.5                         | 0.02                     | 2-12.5                   | 1-2                         | 0-1              |
| MW-2                   | 3/7/2002          | Clearwater      | 2                              | 15                       | 0-3                         | 3-15                           | 0.02                     | 2-15                     | 1-2                         | 0-1              |
| MW-3                   | 3/7/2002          | Clearwater      | 2                              | 15                       | 0-3                         | 3-15                           | 0.02                     | 2-15                     | 1-2                         | 0-1              |
| MW-4                   | 3/7/2002          | Clearwater      | 2                              | 13                       | 0-3                         | 3-13                           | 0.02                     | 2-13                     | 1-2                         | 0-1              |

**Table 2**  
**Groundwater Elevations and Analytical Data**  
 Seymour Residence  
 1111 Riverside Drive  
 Rio Dell, CA  
 Project # AE001C

| Well No. | Sampling Date | TOC (feet) | DTW (feet) | GWE (feet) | TPHg (µg/L) | Benzene (µg/L) | Toluene (µg/L) | Ethylbenzene (µg/L) | Xylenes (µg/L) | MTBE (µg/L) | TBA (µg/L) | DIPE (µg/L) | ETBE (µg/L) | TAME (µg/L) | Methanol (µg/L) | Ethanol (µg/L) | Lead (µg/L) |
|----------|---------------|------------|------------|------------|-------------|----------------|----------------|---------------------|----------------|-------------|------------|-------------|-------------|-------------|-----------------|----------------|-------------|
| MW-1     | 3/13/2002     | 116.42     | 2.15       | 114.27     | 380         | 35             | 6.8            | 16                  | 37             | <0.5        | 7.7        | <0.5        | <0.5        | <0.5        | <50             | <5             | <5          |
|          | 6/18/2002     | 116.42     | 5.57       | 110.85     | 3,700       | 440            | 67             | 130                 | 150            | <0.5        | 28         | <0.5        | <0.5        | <0.5        | <50             | <5             | -           |
|          | 9/19/2002     | 116.42     | 6.78       | 109.64     | 6,900       | 660            | 77             | 400                 | 440            | <2.5        | 39         | <2.5        | <2.5        | <2.5        | <250            | <5             | -           |
|          | 12/31/2002    | 116.42     | 0.69       | 115.73     | <50         | <0.5           | <0.5           | <0.5                | <0.5           | <0.5        | <5         | <0.5        | <0.5        | <0.5        | 65              | <5             | -           |
|          | 3/26/2003     | 116.42     | 1.53       | 114.89     | 300         | 21             | 5.3            | 11                  | 21             | <0.5        | <0.5       | <0.5        | <0.5        | <0.5        | <0.5            | <0.5           | -           |
|          | 6/23/2003     | 116.42     | 5.16       | 111.26     | 8,200       | 550            | 180            | 400                 | 710            | -           | -          | -           | -           | -           | -               | -              | -           |
|          | 9/29/2003     | 116.42     | 7.87       | 108.55     | 28,000      | 1,800          | 1,100          | 1,200               | 3,700          | <10         | <100       | <10         | <10         | <10         | -               | -              | -           |
|          | 12/23/2003    | 116.42     | 3.32       | 113.10     | 1,400       | 190            | 9.8            | 25                  | 45             | <0.5        | 5.5        | <0.5        | <0.5        | <0.5        | -               | -              | -           |
|          | 3/18/2004     | 116.42     | 3.82       | 112.60     | 2,900       | 240            | 73             | 110                 | 380            | <1          | <10        | <1          | <1          | <1          | -               | -              | -           |
|          | 6/22/2004     | 116.42     | 5.47       | 110.95     | 18,000      | 880            | 660            | 610                 | 2,400          | <5.0        | <5.0       | <5.0        | <5.0        | <5.0        | -               | -              | -           |
| MW-2     | 10/5/2004     | 116.42     | 9.92       | 106.50     | 4,200       | 290            | 11             | 250                 | 140            | 0.85        | <0.5       | <0.5        | <0.5        | <0.5        | -               | -              | -           |
|          | 1/4/2005      | 116.42     | 1.74       | 114.68     | <50         | <0.5           | <0.50          | <0.50               | <0.50          | <0.50       | <0.50      | <0.50       | <0.50       | <0.50       | -               | -              | -           |
|          | 3/13/2002     | 115.65     | 9.35       | 106.30     | <50         | <0.5           | <0.5           | <0.5                | <0.5           | <0.5        | <5         | <0.5        | <0.5        | <0.5        | <50             | 26             | <5          |
|          | 6/18/2002     | 115.65     | 5.29       | 110.36     | <50         | <0.5           | <0.5           | <0.5                | <0.5           | <0.5        | <5         | <0.5        | <0.5        | <0.5        | <50             | <5             | -           |
|          | 9/19/2002     | 115.65     | 6.63       | 109.02     | <50         | <0.5           | <0.5           | <0.5                | <0.5           | <0.5        | <5         | <0.5        | <0.5        | <0.5        | <50             | <5             | -           |
|          | 12/31/2002    | 115.65     | 5.61       | 110.04     | <50         | <0.5           | <0.5           | <0.5                | <0.5           | <0.5        | <5         | <0.5        | <0.5        | <0.5        | <50             | <5             | -           |
|          | 3/26/2003     | 115.65     | 5.55       | 110.10     | <50         | <0.5           | <0.5           | <0.5                | <0.5           | <0.5        | <5         | <0.5        | <0.5        | <0.5        | <50             | <5             | -           |
|          | 6/23/2003     | 115.65     | 6.08       | 109.57     | <50         | <0.5           | <0.5           | <0.5                | <0.5           | -           | -          | -           | -           | -           | -               | -              | -           |
|          | 9/29/2003     | 115.65     | 7.15       | 108.50     | <50         | <0.5           | <0.5           | <0.5                | <0.5           | -           | -          | -           | -           | -           | -               | -              | -           |
|          | 12/23/2003    | 115.65     | 6.09       | 109.56     | <50         | <0.5           | <0.5           | <0.5                | <0.5           | -           | -          | -           | -           | -           | -               | -              | -           |
| MW-3     | 3/18/2004     | 115.65     | 5.31       | 110.34     | <50         | <0.5           | <0.5           | <0.5                | <0.5           | -           | -          | -           | -           | -           | -               | -              | -           |
|          | 6/22/2004     | 115.65     | 6.11       | 109.54     | <50         | <0.5           | <0.5           | <0.5                | <0.5           | -           | -          | -           | -           | -           | -               | -              | -           |
|          | 10/5/2004     | 115.65     | 7.47       | 108.18     | <50         | <0.5           | <0.5           | <0.5                | <0.5           | -           | -          | -           | -           | -           | -               | -              | -           |
|          | 1/4/2005      | 115.65     | 1.18       | 114.47     | <50         | <0.5           | <0.50          | <0.50               | <0.50          | -           | -          | -           | -           | -           | -               | -              | -           |
|          | 3/13/2002     | 115.62     | 1.51       | 114.11     | <50         | <0.5           | <0.5           | <0.5                | <0.5           | <0.5        | <5         | <0.5        | <0.5        | <0.5        | <50             | <5             | <5          |
|          | 6/18/2002     | 115.62     | 4.81       | 110.81     | <50         | <0.5           | <0.5           | <0.5                | <0.5           | <0.5        | <5         | <0.5        | <0.5        | <0.5        | <50             | <5             | -           |
|          | 9/19/2002     | 115.62     | 5.48       | 110.14     | <50         | <0.5           | <0.5           | <0.5                | <0.5           | <0.5        | <5         | <0.5        | <0.5        | <0.5        | <50             | <5             | -           |
|          | 12/31/2002    | 115.62     | 0.00       | 115.62     | <50         | <0.5           | <0.5           | <0.5                | <0.5           | <0.5        | <5         | <0.5        | <0.5        | <0.5        | <50             | <5             | -           |
|          | 3/26/2003     | 115.62     | 0.25       | 115.37     | <50         | <0.5           | <0.5           | <0.5                | <0.5           | <0.5        | <5         | <0.5        | <0.5        | <0.5        | <50             | <5             | -           |
|          | 6/23/2003     | 115.62     | 4.44       | 111.18     | <50         | <0.5           | <0.5           | <0.5                | <0.5           | -           | -          | -           | -           | -           | -               | -              | -           |
| MW-4     | 9/29/2003     | 115.62     | 8.01       | 107.61     | <50         | <0.5           | <0.5           | <0.5                | <0.5           | -           | -          | -           | -           | -           | -               | -              | -           |
|          | 12/23/2003    | 115.62     | 2.32       | 113.30     | <50         | <0.5           | <0.5           | <0.5                | <0.5           | -           | -          | -           | -           | -           | -               | -              | -           |
|          | 3/18/2004     | 115.62     | 3.37       | 112.25     | <50         | <0.5           | <0.5           | <0.5                | <0.5           | -           | -          | -           | -           | -           | -               | -              | -           |
|          | 6/22/2004     | 115.62     | 4.83       | 110.79     | <50         | <0.5           | <0.5           | <0.5                | <0.5           | -           | -          | -           | -           | -           | -               | -              | -           |
|          | 10/5/2004     | 115.62     | 10.31      | 105.31     | <50         | <0.5           | <0.5           | <0.5                | <0.5           | -           | -          | -           | -           | -           | -               | -              | -           |
|          | 1/4/2005      | 115.62     | 1.76       | 113.86     | <50         | <0.50          | <0.50          | <0.50               | <0.50          | -           | -          | -           | -           | -           | -               | -              | -           |
|          | 3/13/2002     | 116.75     | 2.41       | 114.34     | <50         | <0.5           | <0.5           | <0.5                | <0.5           | <0.5        | <5         | <0.5        | <0.5        | <0.5        | <50             | <5             | <5          |
|          | 6/18/2002     | 116.75     | 7.31       | 109.44     | <50         | <0.5           | <0.5           | <0.5                | <0.5           | <0.5        | <5         | <0.5        | <0.5        | <0.5        | <50             | <5             | -           |

**Table 2**  
**Groundwater Elevations and Analytical Data**

Seymour Residence  
1111 Riverside Drive  
Rio Dell, CA  
Project # AE001C

| Well No. | Sampling Date | TOC (feet) | DTW (feet) | GWE (feet) | TPHg (µg/L)                 | Benzene (µg/L) | Toluene (µg/L) | Ethylbenzene (µg/L) | Xylenes (µg/L) | MTBE (µg/L) | TBA (µg/L) | DIPE (µg/L) | ETBE (µg/L) | TAME (µg/L) | Methanol (µg/L) | Ethanol (µg/L) | Lead (µg/L) |
|----------|---------------|------------|------------|------------|-----------------------------|----------------|----------------|---------------------|----------------|-------------|------------|-------------|-------------|-------------|-----------------|----------------|-------------|
|          | 9/19/2002     | 116.75     | 10.47      | 106.28     | <50                         | <0.5           | <0.5           | <0.5                | <0.5           | <0.5        | <5         | <0.5        | <0.5        | <0.5        | <50             | <5             | --          |
|          | 12/31/2002    | 116.75     | 1.22       | 115.53     | <50                         | <0.5           | <0.5           | <0.5                | <0.5           | <0.5        | <5         | <0.5        | <0.5        | <0.5        | <50             | <5             | --          |
|          | 3/26/2003     | 116.75     | 2.27       | 114.48     | <50                         | <0.5           | <0.5           | <0.5                | <0.5           | <0.5        | <5         | <0.5        | <0.5        | <0.5        | <50             | <5             | --          |
|          | 6/23/2003     | 116.75     | 7.03       | 109.72     | <50                         | <0.5           | <0.5           | <0.5                | <0.5           | --          | --         | --          | --          | --          | --              | --             | --          |
|          | 9/29/2003     | 116.75     | 10.75      | 106.00     | <50                         | <0.5           | <0.5           | <0.5                | <0.5           | --          | --         | --          | --          | --          | --              | --             | --          |
|          | 12/23/2003    | 116.75     | 4.32       | 112.43     | <50                         | <0.5           | <0.5           | <0.5                | <0.5           | --          | --         | --          | --          | --          | --              | --             | --          |
|          | 3/18/2004     | 116.75     | 4.53       | 112.22     | <50                         | <0.5           | <0.5           | <0.5                | <0.5           | --          | --         | --          | --          | --          | --              | --             | --          |
|          | 6/22/2004     | 116.75     | 7.55       | 109.20     | <50                         | <0.5           | <0.5           | <0.5                | <0.5           | --          | --         | --          | --          | --          | --              | --             | --          |
|          | 10/5/2004     | 116.75     | 12.82      | 103.93     | DRY - NO ANALYSES CONDUCTED |                |                |                     |                |             |            |             |             |             |                 |                |             |
|          | 1/4/2005      | 116.75     | 2.73       | 114.02     | <50                         | <0.50          | <0.50          | <0.50               | <0.50          | --          | --         | --          | --          | --          | --              | --             | --          |

MCL  
Taste & odor threshold 5  
NCRWQCB Cleanup Goals <50

**Notes:**

TOC: Top of casing referenced to benchmark NGS (# AC 9251) Aluminum Cap HPGND CA 01 PA (State HWY 21) TPHg: Total Petroleum Hydrocarbons as Gasoline by EPA Method 8260B

DTW: Depth to water as referenced to benchmark.

GWE: Ground water elevation (msl) as referenced to benchmark

µg/L= micrograms per liter=parts per billion = ppb

"-": Not analyzed, available, or applicable

MCL: Maximum contaminant level, an enforceable drinking water standard

AL: Action level, a nonenforceable drinking water standard

Taste & odor threshold: A drinking water standard

NCRWQCB = North Coast Regional Water Quality Control Board (Region 1)

BTEX by EPA Method 8260B

MTBE: Methyl Tertiary Butyl Ether by EPA Method 8260B

TBA: Tertiary Butyl Alcohol by EPA Method 8260B

DIPE: Di-Isopropyl Ether by EPA Method 8260B

ETBE: Ethyl Tertiary Butyl Ether by EPA Method 8260B

TAME: Tertiary Amyl Methyl Ether by EPA Method 8260B

Methanol by EPA Method 8260B

Ethanol: By EPA Method 8260B

**Table 3**  
**iSOC Field Sampling Parameters**  
 Seymour Residence  
 111 Riverside Drive, Rio Dell, CA

| Well<br>I. D. | Sampling<br>Date        | TOC<br>(feet) | DTW<br>(feet) | GWE<br>(feet) | pH   | TEMP<br>(°F) | COND.<br>(mS/cm) | DO<br>mg/L | ORP<br>mV | Total Fe<br>mg/L | Fe <sup>2+</sup><br>mg/L |
|---------------|-------------------------|---------------|---------------|---------------|------|--------------|------------------|------------|-----------|------------------|--------------------------|
| MW-1          | 10/5/2004 (pre install) | 116.42        | 9.92          | 106.50        | 6.27 | 66.6         | 619              | 3.6        | 47        | 8.8              | 4.6                      |
| MW-1          | 10/25/2004 (2-week)     | 116.42        | 2.98          | 113.44        | 6.47 | 62.9         | 273              | 39.7       | 54        | 1.1              | 0                        |
| MW-1          | 11/2/2004 (4-week)      | 116.42        | 3.91          | 112.51        | 6.26 | 70.1         | 290              | 38.1       | 50        | 0.4              | 0                        |
| MW-1          | 12/03/2004 (8-weeks)    | 116.42        | 3.62          | 112.80        | 6.28 | 49.3         | 257              | 27.7       | 46        | 2.4              | 0                        |
| MW-1          | 1/4/2005 (1st quarter)  | 116.42        | 1.74          | 114.68        | 6.47 | 57.7         | 255              | 30.6       | 47        | 2.8              | 0                        |
| MW-2          | 10/5/2004 (pre install) | 115.65        | 7.47          | 108.18        | 6.12 | 69.5         | 342              | 5.0        | 17        | 1.0              | 0.0                      |
| MW-2          | 10/25/2004 (2-week)     | 115.65        | 5.69          | 109.96        | 6.49 | 64.5         | 364              | 6.5        | 52        | 0.3              | 0.6                      |
| MW-2          | 11/2/2004 (4-week)      | 115.65        | 5.25          | 110.40        | 6.05 | 68.5         | 380              | 6.9        | 53        | 0.0              | 0.0                      |
| MW-2          | 12/03/2004 (8-weeks)    | 115.65        | 4.46          | 111.19        | 6.18 | 49.6         | 257              | 5.1        | 43        | 0.0              | 0.0                      |
| MW-2          | 1/4/2005 (1st quarter)  | 115.65        | 1.18          | 114.47        | 6.49 | 57.4         | 372              | 5.5        | 39        | 0.4              | 0.0                      |

**Notes:**

TOC Top of casing elevation referenced to project datum  
 DTW Depth to water below TOC  
 GWE Groundwater elevation (TOC-DTW)  
 DO dissolved oxygen - milligrams per liter (mg/L)  
 ORP oxidation-reduction potential - millivolts (mV)  
 Total Fe total iron - milligrams per liter (mg/L)  
 Fe<sup>2+</sup> ferrous iron - milligrams per liter (mg/L)



TABLE 4 - INDIRECT GEOCHEMICAL INDICATORS

Site - Jean and Everett Seymour Property  
1111 Riverside Dr.  
Rio Dell, California

| WELL | DATE      | Total Iron<br>(mg/l);<br>Field Test | Ferrous<br>Iron Fe <sup>2+</sup><br>(mg/l);<br>Field Test | Ferric Iron<br>Fe <sup>3+</sup> (mg/l) by<br>subtraction | Fe <sup>2+</sup> /Fe total<br>Ratio | Dissolved Oxygen<br>(mg/l); Field<br>Test | Oxidation<br>Reduction<br>Potential (ORP)<br>(mV);<br>Field Test | pH<br>Field Test | TPH-gasoline<br>(ug/l) | Benzene<br>(ug/l) |
|------|-----------|-------------------------------------|---|--|-------------------------------------|---|--|------------------|------------------------|-------------------|
| MW-1 | 10/5/2004 | 8.8                                 | 4.6   | 4.4  | 52%                                 | 3.6                                       | 47   | 6.27             | 4,200                  | 290               |
|      | 1/4/2005  | 2.8                                 | 0.0   | 2.8  | 0%                                  | 30.6                                      | 47   | 6.47             | <50                    | <0.5              |
| MW-2 | 10/5/2004 | 1.0                                 | 0.0   | 1.0  | 0%                                  | 5   | 17   | 6.07             | <50                    | <0.5              |
|      | 1/4/2005  | 0.4                                 | 0.0   | 0.4  | 0%                                  | 5.5                                       | 39   | 6.49             | <50                    | <0.5              |
| MW-3 | 10/5/2004 | 3.0                                 | 0.0   | 3.0  | 0%                                  | 3.6                                       | -6   | 6.28             | <50                    | <0.5              |
|      | 1/4/2005  | 6.6                                 | 0.0   | 6.6  | 0%                                  | 4.9                                       | 55   | 6.17             | <50                    | <0.5              |
| MW-4 | 10/5/2004 | 3.0                                 | 0.0   | 3.0  | 0%                                  | 3.6                                       | -6   | 6.28             | <50                    | <0.5              |
|      | 1/4/2005  | 1.4                                 | 0.0   | 1.4  | 0%                                  | 6.6                                       | 40   | 6.39             | <50                    | <0.5              |

## NOTES:

mg/L: milligrams per liter.

ND: Not detected above the laboratory reporting limit (see laboratory reports for reporting limits).

NA: Not analyzed

calc: Calculation performed in the laboratory

## CLEARWATER GROUP

### Groundwater Monitoring and Sampling Field Procedures

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#### Groundwater Monitoring

Prior to beginning, a decontamination area is established. Decontamination procedures consist of scrubbing downhole equipment in an Alconox® solution wash (wash solution is pumped through any purging pumps used), and rinsing in a first rinse of potable water and a second rinse of potable water or deionized water if the latter is required. Any non-dedicated downhole equipment is decontaminated prior to use.

Prior to purging and sampling a well, the static water level is measured to the nearest 0.01 feet with an electronic water sounder. Depth to bottom is typically measured once per year, at the request of the project manager, and during Clearwater's first visit to a site. If historical analytical data are not available, with which to establish a reliable order of increasing well contamination, the water sounder and tape will be decontaminated between each well. If floating separate-phase hydrocarbons (SPH) are suspected or observed, SPH is collected using a clear, open-ended product bailer, and the thickness is measured to the nearest 0.01 feet in the bailer. SPH may alternatively be measured with an electronic interface probe. Any monitoring well containing a measurable thickness of SPH before or during purging is not additionally purged and no sample is collected from that well. Wells containing hydrocarbon sheen are sampled unless otherwise specified by the project manager. Field observations such as well integrity as well as water level measurements and floating product thicknesses are noted on the Gauging Data/Purge Calculations form.

#### Well Purging

Each monitoring well to be sampled is purged using either a PVC bailer or a submersible pump. Physical parameters (pH, temperature and conductivity) of the purge water are monitored during purging activities to assess if the water sample collected is representative of the aquifer. If required, parameters such as dissolved oxygen, turbidity, salinity etc. are also measured. Samples are considered representative if parameter stability is achieved. Stability is defined as a change of less than 0.25 pH units, less than 10% change in conductivity in micro mhos, and less than 1.0 degree centigrade (1.8 degrees Fahrenheit) change in temperature. Parameters are measured in a discrete sample decanted from the bailer separately from the rest of the purge water. Parameters are measured at least four times during purging; initially, and at volume intervals of one well volume. Purging continues until three well casing volumes have been removed or until the well completely dewater. Wells which dewater or demonstrate a slow recharge may be sampled after fewer than three well volumes have been removed. Well purging information is recorded on the Purge Data sheet. All meters used to measure parameters are calibrated daily. Purge water is sealed, labeled, and stored on site in D.O.T.-approved 55-gallon drums. After being chemically profiled, the water is removed to an appropriate disposal facility by a licensed waste hauler.

#### Groundwater Sample Collection

Groundwater samples are collected immediately after purging or, if purging rate exceeds well recharge rate, when the well has recharged to at least 80% of its static water level. If recharge is extremely slow, the well is allowed to recharge for at least two hours, if practicable, or until sufficient volume has accumulated for sampling. The well is sampled within 24 hours of purging or repurged. Samples are collected using polyethylene bailers, either disposable or dedicated to the well. Samples being analyzed for compounds most sensitive to volatilization are collected first. Water samples are placed in appropriate laboratory-supplied containers, labeled, documented on a chain of custody form and placed on ice in a cooler for transport to a state-certified analytical laboratory. Analytical detection limits match or surpass standards required by relevant local or regional guidelines.

#### Quality Assurance Procedures

To prevent contamination of the samples, Clearwater personnel adhere to the following procedures in the field:

- A new, clean pair of latex gloves is put on prior to sampling each well.
- Wells are gauged, purged and groundwater samples are collected in the expected order of increasing degree of contamination based on historical analytical results.

- All purging equipment will be thoroughly decontaminated between each well, using the procedures previously described at the beginning of this section.
- During sample collection for volatile organic analysis, the amount of air passing through the sample is minimized. This helps prevent the air from stripping the volatiles from the water. Sample bottles are filled by slowly running the sample down the side of the bottle until there is a convex meniscus over the mouth of the bottle. The lid is carefully screwed onto the bottle such that no air bubbles are present within the bottle. If a bubble is present, the cap is removed and additional water is added to the sample container. After resealing the sample container, if bubbles still are present inside, the sample container is discarded and the procedure is repeated with a new container.

Laboratory and field handling procedures may be monitored, if required by the client or regulators, by including quality control (QC) samples for analysis with the groundwater samples. Examples of different types of QC samples are as follows:

- Trip blanks are prepared at the analytical laboratory by laboratory personnel to check field handling procedures. Trip blanks are transported to the project site in the same manner as the laboratory-supplied sample containers to be filled. They are not opened, and are returned to the laboratory with the samples collected. Trip blanks are analyzed for purgeable organic compounds.
- Equipment blanks are prepared in the field to determine if decontamination of field sampling equipment has been effective. The sampling equipment used to collect the groundwater samples is rinsed with distilled water which is then decanted into laboratory-supplied containers. The equipment blanks are transported to the laboratory, and are analyzed for the same chemical constituents as the samples collected at the site.
- Duplicates are collected at the same time that the standard groundwater samples are being collected and are analyzed for the same compounds in order to check the reproducibility of laboratory data. They are typically only collected from one well per sampling event. The duplicate is assigned an identification number that will not associate it with the source well.

Generally, trip blanks and field blanks check field handling and transportation procedures. Duplicates check laboratory procedures. The configuration of QC samples is determined by Clearwater depending on site conditions and regulatory requirements.

6-inch diameter well  $cf=1.44$  gal/ft

## BURGING DATA

SHEET 1 OF 2

Job No.: A5001E

Location: 111 RIVERSIDE DRIVE  
Rio Del, CA

Date: 1/14/05

Tech: Rodney Berry

WELL  
No.

TIME

VOLUME  
(gal.)COND.  
(mS/cm)TEMP.  
(deg. F.)

PH

1200

DO = 06.6  
ORP = 040FE = 1.4  
FE2+ = 0.0

|             |      |      |     |      |      |                                   |
|-------------|------|------|-----|------|------|-----------------------------------|
| MW-4        | 1140 | 2.00 | 230 | 51.3 | 6.39 | Sample for:                       |
| Calc. purge | 1147 | 3.00 | 149 | 52.4 | 6.38 | TPHg TPHd 8010                    |
| volume      | 1154 | 5.00 | 146 | 52.6 | 6.39 | BTEX Other 8260                   |
| 4.84        |      |      |     |      |      | Purging Method: Disposable Bailer |
|             |      |      |     |      |      | PVC bailer / Pump                 |

COMMENTS: color, turbidity, recharge, sheen

light brown, low, good, no sheen

Sampling Method:

Dedicated / Disposable bailer

WELL  
No.

TIME

VOLUME  
(gal.)COND.  
(mS/cm)TEMP.  
(deg. F.)

PH

1300

DO = 04.9  
ORP = 055FE = 6.6  
FE2+ = 0.0

|             |      |      |     |      |      |                                   |
|-------------|------|------|-----|------|------|-----------------------------------|
| MW-3        | 1217 | 2.00 | 226 | 57.4 | 6.17 | Sample for:                       |
| Calc. purge | 1224 | 4.00 | 227 | 57.3 | 6.18 | TPHg TPHd 8010                    |
| volume      | 1231 | 6.50 | 228 | 57.5 | 6.17 | BTEX Other                        |
| 6.29        |      |      |     |      |      | Purging Method: Disposable Bailer |
|             |      |      |     |      |      | PVC bailer / Pump                 |

COMMENTS: color, turbidity, recharge, sheen

light brown, low, good, no sheen

Sampling Method:

Dedicated / Disposable bailer

WELL  
No.

TIME

VOLUME  
(gal.)COND.  
(mS/cm)TEMP.  
(deg. F.)

PH

1400

DO = 05.5  
ORP = 039FE = 0.4  
FE2+ = 0.0

|             |      |      |     |      |      |                                   |
|-------------|------|------|-----|------|------|-----------------------------------|
| MW-2        | 1320 | 2.00 | 372 | 57.4 | 6.49 | Sample for:                       |
| Calc. purge | 1326 | 4.00 | 371 | 58.2 | 6.46 | TPHg TPHd 8010                    |
| volume      | 1334 | 7.00 | 371 | 58.6 | 6.46 | BTEX Other                        |
| 6.57        |      |      |     |      |      | Purging Method: Disposable Bailer |
|             |      |      |     |      |      | PVC bailer / Pump                 |

COMMENTS: color, turbidity, recharge, sheen

CLEAR, low, good, no sheen

Sampling Method:

Dedicated / Disposable bailer

CLEARWATER GROUP, 229 Tewksbury Ave., Point Richmond, California 94801

Phone: 510-307-9943 Fax: 510-232-2823

ARRIVAL TIME  
TANK PRESSURE 1800  
LINE PRESSURE = 50

DEPARTURE  
TANK 1800  
LINE PRESSURE 50  
SHEET 2 OF 2

PURGING DATA  
111 RIVERSIDE DRIVE

Job No.: AE0015 Location: RIDGELL, CA Date: 1/4/05 Tech: RODNEY BERRY

| WELL No.                                    | TIME | VOLUME (gal.) | COND. (mS/cm) | TEMP. (deg. F.) | pH   |                                   |
|---|------|---------------|---------------|-----------------|------|-----------------------------------|
| MW1   | 1423 | 2.00          | 255           | 57.7            | 6.47 | Sample for:                       |
| Calc. purge                                 | 1428 | 3.00          | 254           | 57.7            | 6.46 | IPHg TPHd 8010                    |
| volume                                      | 1435 | 5.00          | 256           | 57.7            | 6.43 | BTEX Other 50Xys 8260             |
|   |      |               |               |                 |      | Purging Method: Disposable bailer |
|   |      |               |               |                 |      | PVC bailer / Pump                 |
| COMMENTS: color, turbidity, recharge, sheen |      |               |               |                 |      | Sampling Method:                  |
| light brown, low good, NO SHEEN             |      |               |               |                 |      | Dedicated / Disposable bailer     |

| WELL No.                                    | TIME | VOLUME (gal.) | COND. (mS/cm) | TEMP. (deg. F.) | pH |                               |
|---|------|---------------|---------------|-----------------|----|-------------------------------|
|   |      |               |               |                 |    | Sample for:                   |
| Calc. purge                                 |      |               |               |                 |    | TPHg TPHd 8010                |
| volume                                      |      |               |               |                 |    | BTEX Other                    |
|   |      |               |               |                 |    | Purging Method:               |
|   |      |               |               |                 |    | PVC bailer / Pump             |
| COMMENTS: color, turbidity, recharge, sheen |      |               |               |                 |    | Sampling Method:              |
|   |      |               |               |                 |    | Dedicated / Disposable bailer |

| WELL No.                                    | TIME | VOLUME (gal.) | COND. (mS/cm) | TEMP. (deg. F.) | pH |                               |
|---|------|---------------|---------------|-----------------|----|-------------------------------|
|   |      |               |               |                 |    | Sample for:                   |
| Calc. purge                                 |      |               |               |                 |    | TPHg TPHd 8010                |
| volume                                      |      |               |               |                 |    | BTEX Other                    |
|   |      |               |               |                 |    | Purging Method:               |
|   |      |               |               |                 |    | PVC bailer / Pump             |
| COMMENTS: color, turbidity, recharge, sheen |      |               |               |                 |    | Sampling Method:              |
|   |      |               |               |                 |    | Dedicated / Disposable bailer |



Report Number : 41836

Date : 1/10/2005

Matthew Ryder-Smith  
Clearwater Group, Inc.  
229 Tewksbury Avenue  
Point Richmond, CA 94801

Subject : 4 Water Samples  
Project Name : Seymour Residence  
Project Number : AE001E

Dear Mr. Ryder-Smith,

Chemical analysis of the samples referenced above has been completed. Summaries of the data are contained on the following pages. Sample(s) were received under documented chain-of-custody. US EPA protocols for sample storage and preservation were followed.

Kiff Analytical is certified by the State of California (# 2236). If you have any questions regarding procedures or results, please call me at 530-297-4800.

Sincerely,

A handwritten signature in black ink, appearing to read "Joel Kiff".

Joel Kiff



Report Number : 41836

Date : 1/10/2005

Project Name : Seymour Residence

Project Number : AE001E

Sample : MW-1

Matrix : Water

Lab Number : 41836-01

Sample Date : 1/4/2005

| Parameter                     | Measured Value | Method Reporting Limit | Units      | Analysis Method | Date Analyzed |
|-------------------------------|----------------|------------------------|------------|-----------------|---------------|
| Benzene                       | < 0.50         | 0.50                   | ug/L       | EPA 8260B       | 1/7/2005      |
| Toluene                       | < 0.50         | 0.50                   | ug/L       | EPA 8260B       | 1/7/2005      |
| Ethylbenzene                  | < 0.50         | 0.50                   | ug/L       | EPA 8260B       | 1/7/2005      |
| Total Xylenes                 | < 0.50         | 0.50                   | ug/L       | EPA 8260B       | 1/7/2005      |
| Methyl-t-butyl ether (MTBE)   | < 0.50         | 0.50                   | ug/L       | EPA 8260B       | 1/7/2005      |
| Diisopropyl ether (DIPE)      | < 0.50         | 0.50                   | ug/L       | EPA 8260B       | 1/7/2005      |
| Ethyl-t-butyl ether (ETBE)    | < 0.50         | 0.50                   | ug/L       | EPA 8260B       | 1/7/2005      |
| Tert-amyl methyl ether (TAME) | < 0.50         | 0.50                   | ug/L       | EPA 8260B       | 1/7/2005      |
| Tert-Butanol                  | < 5.0          | 5.0                    | ug/L       | EPA 8260B       | 1/7/2005      |
| TPH as Gasoline               | < 50           | 50                     | ug/L       | EPA 8260B       | 1/7/2005      |
| Toluene - d8 (Surr)           | 102            |                        | % Recovery | EPA 8260B       | 1/7/2005      |
| 4-Bromofluorobenzene (Surr)   | 97.3           |                        | % Recovery | EPA 8260B       | 1/7/2005      |

Approved By:

Joel Kiff





Report Number : 41836

Date : 1/10/2005

Project Name : Seymour Residence

Project Number : AE001E

Sample : MW-2

Matrix : Water

Lab Number : 41836-02

Sample Date : 1/4/2005

| Parameter                   | Measured Value | Method Reporting Limit | Units      | Analysis Method | Date Analyzed |
|-----------------------------|----------------|------------------------|------------|-----------------|---------------|
| Benzene                     | < 0.50         | 0.50                   | ug/L       | EPA 8260B       | 1/7/2005      |
| Toluene                     | < 0.50         | 0.50                   | ug/L       | EPA 8260B       | 1/7/2005      |
| Ethylbenzene                | < 0.50         | 0.50                   | ug/L       | EPA 8260B       | 1/7/2005      |
| Total Xylenes               | < 0.50         | 0.50                   | ug/L       | EPA 8260B       | 1/7/2005      |
| TPH as Gasoline             | < 50           | 50                     | ug/L       | EPA 8260B       | 1/7/2005      |
| Toluene - d8 (Surr)         | 102            |                        | % Recovery | EPA 8260B       | 1/7/2005      |
| 4-Bromofluorobenzene (Surr) | 93.1           |                        | % Recovery | EPA 8260B       | 1/7/2005      |

Approved By:

Joel Kiff



Report Number : 41836

Date : 1/10/2005

Project Name : **Seymour Residence**

Project Number : **AE001E**

Sample : **MW-3**

Matrix : Water

Lab Number : 41836-03

Sample Date :1/4/2005

| Parameter                   | Measured Value | Method Reporting Limit | Units      | Analysis Method | Date Analyzed |
|-----------------------------|----------------|------------------------|------------|-----------------|---------------|
| Benzene                     | < 0.50         | 0.50                   | ug/L       | EPA 8260B       | 1/7/2005      |
| Toluene                     | < 0.50         | 0.50                   | ug/L       | EPA 8260B       | 1/7/2005      |
| Ethylbenzene                | < 0.50         | 0.50                   | ug/L       | EPA 8260B       | 1/7/2005      |
| Total Xylenes               | < 0.50         | 0.50                   | ug/L       | EPA 8260B       | 1/7/2005      |
| TPH as Gasoline             | < 50           | 50                     | ug/L       | EPA 8260B       | 1/7/2005      |
| Toluene - d8 (Surr)         | 100            |                        | % Recovery | EPA 8260B       | 1/7/2005      |
| 4-Bromofluorobenzene (Surr) | 91.0           |                        | % Recovery | EPA 8260B       | 1/7/2005      |

Approved By:

Joel Kiff



Report Number : 41836

Date : 1/10/2005

Project Name : Seymour Residence

Project Number : AE001E

Sample : MW-4

Matrix : Water

Lab Number : 41836-04

Sample Date : 1/4/2005

| Parameter                   | Measured Value | Method Reporting Limit | Units      | Analysis Method | Date Analyzed |
|-----------------------------|----------------|------------------------|------------|-----------------|---------------|
| Benzene                     | < 0.50         | 0.50                   | ug/L       | EPA 8260B       | 1/7/2005      |
| Toluene                     | < 0.50         | 0.50                   | ug/L       | EPA 8260B       | 1/7/2005      |
| Ethylbenzene                | < 0.50         | 0.50                   | ug/L       | EPA 8260B       | 1/7/2005      |
| Total Xylenes               | < 0.50         | 0.50                   | ug/L       | EPA 8260B       | 1/7/2005      |
| TPH as Gasoline             | < 50           | 50                     | ug/L       | EPA 8260B       | 1/7/2005      |
| Toluene - d8 (Surr)         | 99.5           |                        | % Recovery | EPA 8260B       | 1/7/2005      |
| 4-Bromofluorobenzene (Surr) | 94.7           |                        | % Recovery | EPA 8260B       | 1/7/2005      |

Approved By:

Joel Kiff

**QC Report : Method Blank Data**

**Project Name : Seymour Residence**

**Project Number : AE001E**

**Report Number : 41836**

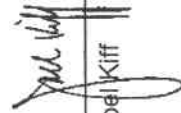
**Date : 1/10/2005**

| Parameter                     | Measured Value | Method Reporting Limit | Units | Analysis Method | Date Analyzed | Parameter                     | Measured Value | Method Reporting Limit | Units | Analysis Method | Date Analyzed |
|-------------------------------|----------------|------------------------|-------|-----------------|---------------|-------------------------------|----------------|------------------------|-------|-----------------|---------------|
| Benzene                       | < 0.50         | 0.50                   | ug/L  | EPA 8260B       | 1/6/2005      | Benzene                       | < 0.50         | 0.50                   | ug/L  | EPA 8260B       | 1/6/2005      |
| Toluene                       | < 0.50         | 0.50                   | ug/L  | EPA 8260B       | 1/6/2005      | Toluene                       | < 0.50         | 0.50                   | ug/L  | EPA 8260B       | 1/6/2005      |
| Ethylbenzene                  | < 0.50         | 0.50                   | ug/L  | EPA 8260B       | 1/6/2005      | Ethylbenzene                  | < 0.50         | 0.50                   | ug/L  | EPA 8260B       | 1/6/2005      |
| Total Xylenes                 | < 0.50         | 0.50                   | ug/L  | EPA 8260B       | 1/6/2005      | Total Xylenes                 | < 0.50         | 0.50                   | ug/L  | EPA 8260B       | 1/6/2005      |
| Methyl-t-butyl ether (MTBE)   | < 0.50         | 0.50                   | ug/L  | EPA 8260B       | 1/6/2005      | Methyl-t-butyl ether (MTBE)   | < 0.50         | 0.50                   | ug/L  | EPA 8260B       | 1/6/2005      |
| Diisopropyl ether (DIPE)      | < 0.50         | 0.50                   | ug/L  | EPA 8260B       | 1/6/2005      | Diisopropyl ether (DIPE)      | < 0.50         | 0.50                   | ug/L  | EPA 8260B       | 1/6/2005      |
| Ethyl-t-butyl ether (ETBE)    | < 0.50         | 0.50                   | ug/L  | EPA 8260B       | 1/6/2005      | Ethyl-t-butyl ether (ETBE)    | < 0.50         | 0.50                   | ug/L  | EPA 8260B       | 1/6/2005      |
| Tert-amyl methyl ether (TAME) | < 0.50         | 0.50                   | ug/L  | EPA 8260B       | 1/6/2005      | Tert-amyl methyl ether (TAME) | < 0.50         | 0.50                   | ug/L  | EPA 8260B       | 1/6/2005      |
| Tert-Butanol                  | < 5.0          | 5.0                    | ug/L  | EPA 8260B       | 1/6/2005      | Tert-Butanol                  | < 5.0          | 5.0                    | ug/L  | EPA 8260B       | 1/6/2005      |
| TPH as Gasoline               | < 50           | 50                     | ug/L  | EPA 8260B       | 1/6/2005      | TPH as Gasoline               | < 50           | 50                     | ug/L  | EPA 8260B       | 1/6/2005      |
| Toluene - d8 (Surr)           | 102            |                        | %     | EPA 8260B       | 1/6/2005      | Toluene - d8 (Surr)           | 102            |                        | %     | EPA 8260B       | 1/6/2005      |
| 4-Bromofluorobenzene (Surr)   | 101            |                        | %     | EPA 8260B       | 1/6/2005      | 4-Bromofluorobenzene (Surr)   | 101            |                        | %     | EPA 8260B       | 1/6/2005      |

KIFF ANALYTICAL, LLC

2795 2nd St, Suite 300 Davis, CA 95616 530-297-4800

Approved By: Joel Kiff



Report Number : 41836


Date : 1/10/2005

**QC Report : Matrix Spike/ Matrix Spike Duplicate**

Project Name : **Seymour Residence**

Project Number : **AE001E**

| Parameter            | Spiked Sample | Sample Value | Spike Level | Spike Dup. Level | Spiked Sample Value | Duplicate Spiked Sample Value | Units | Analysis Method | Date Analyzed | Spiked Sample Percent Recov. | Duplicate Spiked Sample Percent Recov. | Relative Percent Diff. | Spiked Sample Percent Recov. Limit | Relative Percent Diff. Limit |
|----------------------|---------------|--------------|-------------|------------------|---------------------|-------------------------------|-------|-----------------|---------------|------------------------------|--|------------------------|------------------------------------|------------------------------|
| Benzene              | 41834-01      | <0.50        | 40.0        | 39.8             | 38.4                | 38.2                          | ug/L  | EPA 8260B       | 1/6/05        | 96.1                         | 96.0                                   | 0.126                  | 70-130                             | 25                           |
| Toluene              | 41834-01      | <0.50        | 40.0        | 39.8             | 41.2                | 41.2                          | ug/L  | EPA 8260B       | 1/6/05        | 103                          | 104                                    | 0.407                  | 70-130                             | 25                           |
| Tert-Butanol         | 41834-01      | <5.0         | 200         | 199              | 191                 | 193                           | ug/L  | EPA 8260B       | 1/6/05        | 95.5                         | 96.8                                   | 1.33                   | 70-130                             | 25                           |
| Methyl-t-Butyl Ether | 41834-01      | <0.50        | 40.0        | 39.8             | 37.6                | 37.2                          | ug/L  | EPA 8260B       | 1/6/05        | 94.0                         | 93.4                                   | 0.575                  | 70-130                             | 25                           |

Approved By:  Joel Kiff

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Report Number : 41836

Date : 1/10/2005

**QC Report : Laboratory Control Sample (LCS)**

Project Name : **Seymour Residence**

Project Number : **AE001E**

| Parameter            | Spike Level | Units | Analysis Method | Date Analyzed | LCS Percent Recov. | LCS Percent Recov. Limit |
|----------------------|-------------|-------|-----------------|---------------|--------------------|--------------------------|
| Benzene              | 40.0        | ug/L  | EPA 8260B       | 1/6/05        | 96.2               | 70-130                   |
| Toluene              | 40.0        | ug/L  | EPA 8260B       | 1/6/05        | 103                | 70-130                   |
| Tert-Butanol         | 200         | ug/L  | EPA 8260B       | 1/6/05        | 102                | 70-130                   |
| Methyl-t-Butyl Ether | 40.0        | ug/L  | EPA 8260B       | 1/6/05        | 91.9               | 70-130                   |

Approved By:

KIFF ANALYTICAL, LLC

2795 2nd St, Suite 300 Davis, CA 95616 530-297-4800

Joe Kiff



2795 2nd Street, Suite 300  
Davis, CA 95616  
Lab: 530.297.4800  
Fax: 530.297.4808

Project Contact (Hard copy or PDF To):

Matthew Ryder-Smith  
Company/Address: C. W. G. D.  
229 TEWKSBURY AVE. #1, RIVERDALE, CA

Phone No.: (570) 307-9943 (510) 232-2823

FAX No.:

Project Number: 510

P.O. No.:

Project Name: Seymour Residence

Project Address: Riverside Drive

Riverdale, CA

Sample Designation

MW-1

MW-2

MW-3

MW-4

Sampling

Date

Time

14/05 1500H

14/05 1400

14/05 1300

14/05 1200

Container

SLEEVE

40 ml VOA

Preservative

HCl

HNO<sub>3</sub>

ICE

NONE

Matrix

WATER

SOIL

California EDF Report? ☒ Yes ☐ No

Recommended but not mandatory to complete this section:

Sampling Company Log Code: C.W.G.D

Global ID: T-0-6-0-2-3-0-0-0-3-1

EDF Deliverable To (Email Address):

chris@cwgdwatergroup.com

Sampler Signature: *Rodney Beary*

# Chain-of-Custody Record and Analysis Request

## Analysis Request

| Analysis Request                       | For Lab Use Only             |
|--|------------------------------|
| BTEX (8021B)                           |                              |
| BTEX/TPH Gas/MTBE (8021B/M8015)        |                              |
| TPH as Diesel (M8015)                  |                              |
| TPH as Motor Oil (M8015)               |                              |
| TPH Gas/BTEX/MTBE (8260B)              |                              |
| 5 Oxygenates/TPH Gas/BTEX (8260B)      | X                            |
| 7 Oxygenates/TPH Gas/BTEX (8260B)      |                              |
| 5 Oxygenates (8260B)                   |                              |
| 7 Oxygenates (8260B)                   |                              |
| Lead Scav. (1,2 DCA & 1,2 EDB - 8260B) |                              |
| EPA 8260B (Full List)                  |                              |
| Volatile Halocarbons (EPA 8260B)       |                              |
| Lead (7421/239.2) TOTAL (X) W.E.T. (X) | TPH/BTEX (8260B)             |
|  | X                            |
|  | 10/20/01                     |
|  | -02                          |
|  | -03                          |
|  | -04                          |
|  | 12 hr/24 hr/48 hr/72 hr/1 wk |

Remarks:

Relinquished by: *Rodney Beary*

Relinquished by: *Rodney Beary*

Relinquished by: *Rodney Beary*

Relinquished by: *Rodney Beary*

Relinquished by: *Rodney Beary*

Relinquished by: *Rodney Beary*

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Relinquished by: *Rodney Beary*

Relinquished by: *Rodney Beary*

Relinquished by: *Rodney Beary*

Relinquished by: *Rodney Beary*

Distribution: White - Lab, Pink - Originator

Forms/coc 121001.fh9

## Attachment II

### Indirect Geochemical Indicator Study

Enhanced bioremediation samples include the contaminants, as well as nitrate and sulfate, macronutrients: orthophosphate-phosphate and ammonia as nitrogen. Oxygen demand in the groundwater samples includes five-day biological oxygen demand (BOD<sub>5</sub>) and chemical oxygen demand (COD). Total inorganic carbon will also be evaluated. Additional analyses include total organic carbon, total dissolved solids, and alkalinity (speciated). Total heterotrophic count and specific hydrocarbon degraders will be performed. A summary of analytical is shown below:

| <u>Direct Indicator</u>              | <u>Analyses</u>  |
|--------------------------------------|--|
| Contaminant                          | TPH-g, TPH-d, BTEX, MTBE, TBA, etc.  |
| <u>Indirect Indicators</u>           | <u>Analyses</u>  |
| Microbial Activity                   | Total Heterotrophic Plate Count<br>Specific Hydrocarbon Degraders  |
| Macronutrients                       | Ammonia as nitrogen<br>Ortho-phosphate   |
| Terminal Electron Acceptors<br>field | Oxygen, measured as dissolved oxygen (DO) in<br><br>Nitrate (lab analysis)<br>Ferrous iron (Fe <sup>+2</sup> ) and Total iron (field kits)<br>Sulfate (lab analysis) |
| Total Oxygen Demand                  | Solid or sediment oxygen demand (SOD, lab)<br>Water oxygen demand:<br>Chemical Oxygen Demand (COD, lab)<br>Biological Oxygen Demand (BOD <sub>5</sub> , lab)         |
| REDOX, Field Parameters<br>meter)    | Dissolved Oxygen (DO) (downhole meter)<br>Oxidation-Reduction Potential (ORP) (downhole<br><br>Temperature, pH, conductivity (field meter)                           |
| Carbon Status                        | Total organic carbon (TOC, lab)<br>Total inorganic carbon (TIC, lab)<br>Speciated Alkalinity (lab)   |
| Other Analyses                       | Total dissolved solids (TDS, lab)  |





CC: Jean and Everett Seymour  
1111 Riverside Drive  
Rio Dell, CA 95562

Ms. Kasey Ashley  
North Coast Regional Water Quality Control Board  
5550 Skylane Boulevard, Suite A  
Santa Rosa, CA 95403